



COPY

7 January 1952

PORTABLE AUTOMATIC MORSE PUNCHING
AND KEYING MACHINE (P A M M)

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This device was developed by and is solely owned by [redacted] Applications
[redacted] for patents are being filed.

It is estimated roughly that in lots of 5,000 this instrument can be manufactured at a cost of \$75.00 to \$100.00.

It is further roughly estimated that tooling to produce at an efficient rate (5,000 or more) would cost about \$50,000. Production of smaller quantities could be tooled for less economical manufacture at from \$15,000 to \$25,000.

Delivery of a reasonable quantity of prototypes, to be substantially hand made, could be made in about 90 days.

The fundamental elements of the machine are:

1. Dial and Indexing Mechanism:

An external engraved dial containing the alphabet and numerals coupled with double internal indexing devices and means for operating and indexing the selector, and indexing the dial. The two indexing devices are designed to cause the dial and selector, respectively, to automatically index accurately when the dial is turned approximately, rather than having to turn it exactly, to the character desired.

There are six parts. Tolerances are .001"

2. Selector Mechanism:

A type of complex high precision cam consisting of about 70 component parts.

Tolerances are from .0001" to .001"

This device performs two functions:

- A. Automatically determines the amount of tape required for each letter of the alphabet and each numeral in any sequence from the shortest (E) to the longest (zero), including the spacing between characters, as each is dialed. The number of different selections thus made by the present model is thirty one.
- B. Automatically selects the combinations of punches required to perforate the tape with the International Morse Code symbol for each letter or numeral dialed. The number of different selections made is thirty-six.

SUBJECT: Portable Automatic Morse Punching and Keying Machine (P A M M)

3. Punching Mechanism:

There are about 60 parts in the mechanism. Tolerances are .0005" to .001". Perforation of the tape is accomplished by nineteen small punches operating in a common die, all of tool steel hardened and ground. The punches have a specially developed cutting edge which shears, rather than punches, the entire slug from the tape. Also included are means for assuring uniform strokes and positioning of the punches and ejection of the slugs.

4. Spacing Mechanism:

Ten parts. Tolerances .001" to .002"
Automatically feeds the requisite amount of tape, as determined by the selector, into the punching mechanism.

5. Lever Actuating System:

Twenty parts. Tolerances .001" to .002"
Provides the means by which operation of the external lever, in sequence, actuates (1) the spacing mechanism, then (2) the punching mechanism, and on the return stroke (3) clears the punching, selecting and spacing mechanisms, and (4) releases one and actuates a second safety device.

The Safeties:

- (1) Lock the machine, except the dial, to prevent inadvertent operation - especially while dialing. A button on the external bar is pushed to release.
- (2) Assure completion of the punching cycle by preventing the return of the external lever to its starting position until the punching operation has been completed.

6. Word Spacing Lever:

Three parts. Tolerances - .002" to .003"
Provides means by an external button of spacing between words, sentences, etc.

7. Tape Cut Off Mechanism:

Seven parts. Tolerances .002" to .003"
Provides means for cutting off the tape, after a message has been punched, by pressing an external button. An arrow head and tail are cut in the tape to indicate the beginning and end of the message. The cut off cannot be operated until the message is complete and ready for transmission.

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8. Semi-Automatic Key:

Twenty-five parts. Tolerances .001" to .005"

This mechanism, electrically connected to the key circuit of any transmitter by cable and plug, automatically "keys" the message punched into the tape by manually turning a crank which feeds the tape through it. The crank is hinged and the handle recessed in the case until it is required.

Transmission speed is determined by the rate at which the crank is revolved. It is presently geared to deliver an easy 25 words per minute.

The tape enters and leaves the key through slots in one end of the machine.

9. Tape Magazine:

To hold thirty feet of tape (sufficient for 75 words) is installed in the end of the machine opposite the key.

10. Materials:

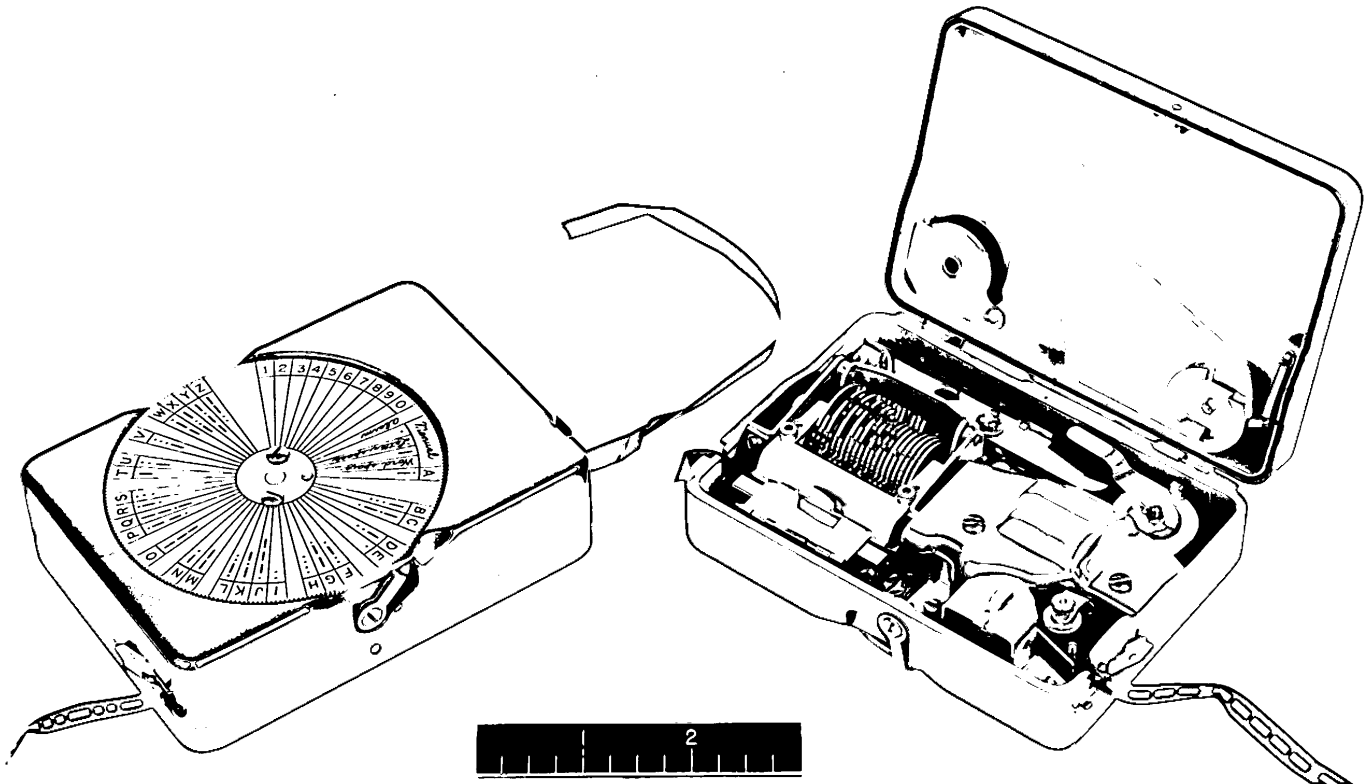
The machine is made of steel, aluminum, brass, copper and plastic.

- 1 Engineering model produced and better tape and governor being produced & developed
- 2 Prototypes expected in near future.

80.19
44.56

35.63

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PERFORATOR SET, TAPE TELEGRAPH AN/UGT-1 . (Service-Test Model)
Group 3/4 View . PERFORATOR, TAPE TELEGRAPH TH-24()/UGT . Showing (L) Unit, Cover
Closed, Displaying Character Selector Dial, (R) Unit, Cover Open, Displaying Punching
and Selector Mechanism

DATE 24 Jul 56

SIGNAL CORPS ENGINEERING LABORATORIES

NO. SCEL 45753

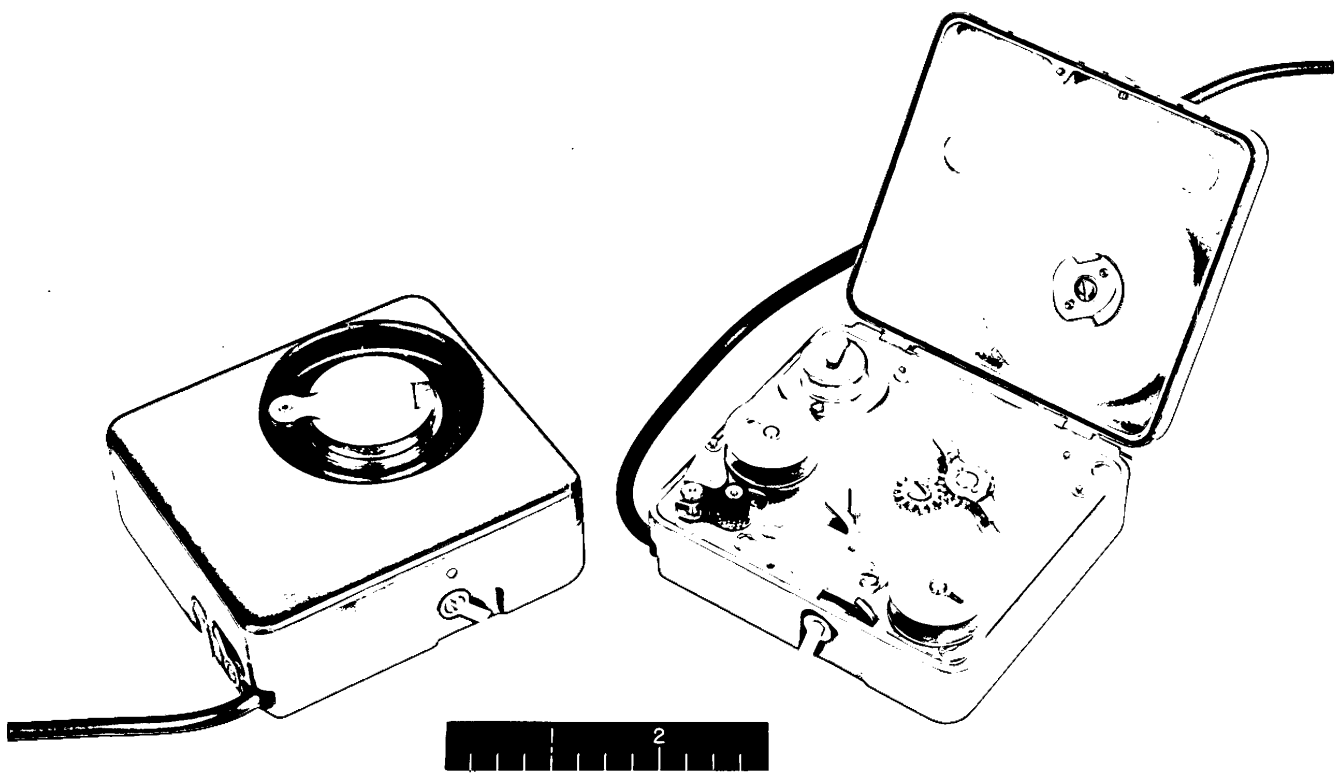
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PERFORATOR SET, TAPE TELEGRAPH AN/UGT-1 . (Service-Test Model)
Group 3/4 View . KEYS KY-201()/UGT . Showing (L) Unit, Cover Closed, (R) Unit, Cover
Open, Displaying Tape Mechanism

DATE 24 July 56

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PORTABLE AUTOMATIC MORSE PUNCHING AND KEYING MACHINE

Our Code Name: P A M M

DEVELOPED AND OWNED BY



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SPECIFICATIONS

Weight: 1 pound 3 ounces in its present form, with 3 feet of cable and plug and 30 feet of 8mm plastic tape in magazine (sufficient for three 25-word messages). Additional rolls of tape are provided.

Dimensions: 8 inches long, 2½ inches wide, 1 inch high (see photographs attached).

PURPOSE

To enable the easy, rapid, accurate, automatic transmission of International Morse Code with any radio transmitter (or by blinker) by unskilled personnel. This light-weight, pocket-size device was designed to permit anyone -- unskilled or otherwise -- to prepare and transmit any continuous message of up to seventy-five words by code.

OPERATION

Punching: The message to be transmitted is punched in Morse code (dots and dashes) on a plastic tape by dialing the requisite letters of the alphabet (or numerals) on the external dial and depressing the punch lever for each such character. Correct spacing between all characters is automatic. A separate lever is provided for spacing between words (see the sample tape attached).

A safety button, which must be depressed before each stroke, prevents the punch lever from being accidentally depressed. An additional safety prevents the

OPERATION (Continued)

lever from returning to a starting position until pressed "home" to assure a complete perforation of the tape.

The average five-letter word, including spacing, requires about 4 inches of tape; twenty-five words, about 10 feet.

When the complete message has been punched, that portion of the tape containing it is cut off by pressing a cut-off bar which forms a "head" and a "tail" on the tape to indicate beginning and end. The cut-off bar cannot be actuated until the message is complete and ready for transmission.

Keying: To transmit the message, the tape is inserted in a slot in the keying end of the device (see photograph attached), the plug inserted in the transmitter jack, and a recessed crank turned. This automatically "keys" or transmits the punched message. The present manual crank permits transmission at any speed up to 25 wpm. A spring-driven, governor-controlled drive could be added. Pre-cut messages could be used.

Transmission is "letter perfect." The tape may be destroyed if necessary. The machine may be operated with one hand.

SOME POSSIBLE APPLICATIONS

To enable CW communication with base when the radio operator attached to any crew is incapacitated.

To permit CW communication with Headquarters by forward or observation elements, including aerial observers, where voice communication is not advisable, or distances too great.

To permit communication with Headquarters by advance or remotely located elements, especially where distances are great, accuracy of transmission essential, and elapsed time of transmission vital.

For use by advance elements such as paratroops or assault troops.

For instructional purposes.